RECEIVED
CENTRAL FAX CENTER

JUL 0 2 2007

Attorney Docket No.: P-4785-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	ROTH, Shmuel et al.	Examiner:	XU, Kevin K.
Serial No.:	10/500,896	Group Art Unit:	2628
Filed:	March 3, 2004		
Title:	ELECTRONIC COLOR DISPLAY FOR SOFT PROOFING		

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Board of Patent Appeals and Interferences
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. Real Party in Interest

The real party in interest is GENOA COLOR TECHNOLOGIES LTD.

II. Related Appeals and Interferences

There are no related appeals or interferences known to the Appellants.

III. Status of the Claims

Claims 1-22 have been finally rejected.

Claims 1-22 are appealed.

IV. Status of Amendments

No amendment has been filed subsequent to the final rejection.

07/03/2007 MGEBREM1 00000092 503355 10500896
02 FC:2402 250.00 DA

V. Summary of Claimed Subject Matter

The below is a brief explanation of the subject matter recited in each of the independent claims involved in this Appeal. It will be recognized that while the below explanation is based on the claims, the actual claim language (and not the below explanation) defines the scope of the invention herein.

Some embodiments of the invention include a display for reproducing an image intended for printing on a substrate using a set of inks, such that the display accurately reproduces the perceived color gamut of the image will have when printed on the substrate. The display includes a light source to generate a set of at least three colors, and a controller to combine the colors in a manner so as to substantially reproduce the image. In particular, the display colors used by the display are selected so as to define a viewed color gamut that entirely covers the perceived color gamut of the inks on the substrate, thereby ensuring that any possible combination of the inks may be reproduced on the display. The at least three colors may be produced sequentially by a color filtering mechanism, and the addition of the colors may produce the desired image on the display.

Likewise, a method is recited according to embodiments of the present invention for reproducing on a display a proofed image intended for printing on a substrate using a set of inks, the method comprising producing light of at least three colors having at least three different chromaticities, respectively, the chromaticities selected to define a viewed color gamut which entirely covers a perceived color gamut of the set of inks when printed on said substrate, and selectively controlling the path of the light of the at least three colors to produce a light pattern corresponding to said proofed image.

VI. Grounds of Rejection to be Reviewed on Appeal

The following grounds of rejection are to be reviewed in this Appeal:

A. The Examiner's contention that claims 1-4, 6-13, 15-16, 18-22 are unpatentable under 35 USC §103(a), over United States Patent Number 6,304,237 to Karakawa ("Karakawa") in view of United States Patent Number 6,069,601 to Lind ("Lind").

B. The Examiner's contention that claim 5 is unpatentable under 35 USC §103(a) over Karkawa in view of Lind in further view of United States Patent Number 6,972,736 to Wada ("Wada").

C. The Examiner's contention that claims 14 and 17 are unpatentable under 35 USC §103(a) over Karkawa in view of Lind in further view of United States Patent Application Publication Number 2002-0122019 to Baba ("Baba").

VII. Argument

1. Claims 1-4, 6-13, 15-16 and 18-22 are patentable under 35 USC §103(a) over Karakawa in view of Lind

A. The Examiner has not made a prima facie case because the Lind and Karakawa references teach away from each other

In the final Office action, the Examiner rejected claims 1-4, 6-13, 15-16 and 18- 22 under 35 U.S.C. § 103(a), as being unpatentable over Karakawa in view of Lind.

The Karakawa patent describes a laser system for producing each of three monochromatic colors (red, green, and blue) for a transmissive LCD display using additive colors. According to the abstract, Karakawa discloses:

> A monochromatic red (R), green (G), blue (B) pulsed laser light source (FIG. 2) for use in a full color video/image display system particularly an LCD display system (FIG. 3), the light source generating R,

> G, B laser beams with minimum speckle noise, and having digital color space conversion incorporated within.

However, as the Examiner has conceded in the final Office action, Karakawa fails to teach either (a) a proofed image or (b) chromaticies selected to define a viewed color gamut that covers the perceived color gamut of the set of inks when printed on the substrate. In fact, there is nothing to suggest that the Karakawa reference teaches anything but a general-purpose color display.

The Examiner therefore cited the Lind reference. The Lind reference describes a system in which a white light source is filtered by a set of three colored layers of cyan, magenta and yellow **stacked** one on top of the other in alignment. The intensity of light passing through each layer may be controlled separately to determine the density of the filtering color, thereby determining a single resultant color. It is described that the colors of the filters in the Lind reference are chosen to fit spectrally the colors of the printing colorants.

The Examiner, however, has failed to carry his burden of proof under Section 103(a) that the recited claims would have been obvious based on these references. For the reasons presented below, it would not have been obvious to one of skill in the art to combine the references and arrive at the pending claims.

The device described by the Lind reference is fundamentally a **subtractive** color display. That is, the pigmented layers described by the Lind reference are subtractive color filters, each of which absorbs a range of light wavelengths and transmits the color of the filter. The Lind device, therefore, is intuitively well-suited to simulate the process of color printing: subtractive color was used to model white light striking the surface of the paper and filtered by the ink layers. Accordingly, the Lind reference teaches cyan, magenta and yellow subtractive color filters, each of which is spectrally matched with the cyan, magenta and yellow of the printer's inks. That is, the cyan filter matches the cyan ink, etc.:

> the selection of the particular colors for the pigmented acrylic or pigmented photoresist layer 34 can be made keeping in mind the particular inks and paper to be used in the final printing process, as well as the type of printing process (e.g., gravure, offset, flexography, etc. . .). Generally, if a set of selected printing inks or colors are to be used to reproduce an image, a plurality of display elements in the form of the pigmented layers 23 are selected each for displaying a color substantially spectrally matched to one of the set of printing colors. (Lind, column 3, lines 55-65)

Therefore, in order to solve the problem how to represent of a subtractive printing process on a display, Lind discloses a subtractive color display.

In order to show that the pending claims would have been obvious, the Examiner must show that it would have been obvious to combine the teachings of Karakawa and Lind. However, the references are intended to solve very different problems, and indeed <u>teach away</u> from combination with each other. Accordingly, the Examiner has failed to carry this burden.

Contrary to Lind's teaching of using a subtractive color display, applicants have understood that such a subtractive system as described by Lind does not work as well or as economically as described by Lind. Therefore, the present application describes (and claim 1 recites) a color display system to reproduce color printing including a light source to generate <u>light of a set of at least three colors having at least three different chromaticities, respectively, said chromaticities being selected to define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate</u>".

Applicants note that while not stated in so many words, claim 1 recites an additive color system; it includes a light source to generate light of a set of at least three colors having at least three different chromaticities, and the colors define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate. First, a subtractive color system, such as that

described by Lind, does not generate light of three different colors, but rather produces a single color by successive filtering. Second, in a subtractive system such as Lind, the selected colors do not define a viewed color gamut which entirely covers a perceived color gamut. Therefore, the pending claims clearly recite an **additive** color system.

Therefore, to say that it would have been obvious to replace the entire subtractive color system of Lind with an additive color system would be to turn the Lind reference on its head. The subtractive color system is the sum total of Lind's alleged invention.

Moreover, if one were to take Lind's system and use an additive combination of colors, it would be inoperable, because the colors chosen by Lind would render the device inoperable. Additive (rather than subtractive) combination of cyan, magenta and yellow colors would not result in a suitable color image because color information would be lost in the additive combination. That is, Lind's solution of a subtractive system specifically teach away from an additive system of the pending claims, i.e., a light source to generate light of a set of at least three colors having at least three different chromaticities, as recited in claim 1.

Next, the Examiner has failed to demonstrate that it would have been obvious to modify Karakawa to include the print proofing system of the present application.

Karakawa teaches monochromatic red, blue and green pulsed laser light source. The display disclosed by the Karakawa reference is designed especially for monochromatic red, blue and green pulsed laser light source and for no other colors of light source. Specifically, Karakawa discloses:

> a monochromatic R, G, B pulsed laser light source adapted for display applications, and particularly, LCD display systems. The light source includes a single or multiple laser master oscillator ... to provide a pulsed, signal wave laser radiation, e.g., of about 1342 nm, 1047 nm arid 1064 nm ... The light source includes single or multiple, preferably all solid state, non-linear frequency converters ... to produce a green wavelength, e.g., about 532 nm or 523.5 nm; with slight spatial incoherency to reduce speckle, red wave length, e.g., about 626 nm to 629 nm with narrow spectrum

> incoherency to reduce speckle; and blue wave length, e.g., about 447 nm to 452 nm, which R,G,B wavelengths are particularly useful for color display purposes, such as when the light source is coupled with, and used in a three LCD display system, as hereinafter described...

The printer that will use monochromatic red, blue and green ink colors will be able to print, besides the monochromatic red, blue and green, only black or a color close to black. Therefore, the monochromatic red, blue and green taught by Karakawa cannot substantially spectrally match to a set of printing colors of a printer, as taught by Lind.

It is nothing more than hindsight for the Examiner to reject claims of the present application based on the suggestion that one of ordinary skill in the art aware of the Karakawa and Lind references would have taken the teachings of Karakawa (an additive display, unrelated to print proofing) and combined it with the teachings of Lind (a subtractive display for print proofing). Nothing would have suggested this combination, nor would it have been obvious to try combining features from the two references. These types of technology are based on different fundamental concepts and it would not have been obvious to take one teaching in isolation from one reference and combine it with teachings from the other.

B. The Examiner has not made a prima facie case because <u>the Lind and Karakawa references cannot be combined</u>

As discussed above, a combination of Lind with Karakawa will not provide display appearance which is substantially spectrally matched to a set of printing colorants. A display in accordance with Lind would have selected as each of its color filters a color substantially spectrally matched to one of the set of printing colors. The monochromatic RGB laser light source cannot substantially spectrally match to one of the set of printing colors, as taught by Lind.

On the other hand, if one were to take the set of monochromatic laser lights from Karakawa and filter them through the pigmented layers described by Lind which are selected each for displaying a color substantially spectrally matched to one of the

set of printing colors, the spectral characteristics of the light would not change, because a monochromatic light filtered by any filter would still be monochromatic of the same wavelength (perhaps with the intensity reduced). Thus, including the teaching of Karakawa with the Lind apparatus would not operate to produce a device capable of generating a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on a substrate, as recited in claim 1 of the present application.

In particular, the ability of the Lind display to create a spectral match relies on the use of spectrally wide band white light. However, Karakawa uses monochromatic or spectrally narrow lasers. It is clear therefore, that combining Karakawa's monochromatic RGB lasers with Lind's color filters would not have been obvious, and in any event, would not have resulted in a spectral color match. It is clear that no person skilled in the art would have thought or wanted to combine Karakawa with Lind because such combination has no benefit whatsoever. In fact, the combination would produce an inoperable or unacceptably inferior system.

Accordingly, Appellants respectfully submit that claims 1-4, 6-13, 15-16 and 18- 22 are patentable under 35 USC §103(a) over Karakawa in view of Lind.

3. Claim 5 is patentable under 35 USC §103(a) over <u>Karkawa in view of Lind in further view of Wada</u>

In the Final Office Action, the Examiner rejected claim 5 under 35 U.S.C. §103(a), as being unpatentable over Karakawa in view of Lind in further view of Wada.

The Examiner has rightly stated that neither Karakawa nor Lind explicitly teaches a polychromatic light and a color filtering mechanism to sequentially generate the light of said at least three colors by filtering said polychromatic light.

Applicants have discussed above the reasons why Karakawa and Lind cannot be combined to produce a light source to generate light of a set of at least three colors having at least three different chromaticities, the chromaticities defining a viewed color gamut which entirely covers a perceived color gamut of a set of inks.

In addition, neither Karakawa nor Lind can be combined with Wada.

Wada discloses a rotary color filter being disposed in front of a light source emitting white light.

As discussed above, Lind teaches a subtractive color system, and therefore comprises a set of filters stacked one on top of the other in alignment. In this way Lind imitates the layers of ink printed on the substrate. If each of the pigmented filter layers in Lind is spectrally matched with one of a set of inks, white light filtered through the pigmented filter layers will produce the same colors as the printed substrate lightened with the same white light. This imitation is enabled due to the subtractive nature of the Lind filters, which is the same as the subtractive nature of the ink layers. The generation of sequential color taught by Wada is of an additive nature, because in order to produce the colored image the sequentially filtered colors has to be added to each other in different additive combinations. In order to produce a subtractive system, filters have to be stacked in layers as taught by Karakawa. A time-sequential filter cannot produce a subtractive color system.

Moreover, choosing each of the segments of the rotary color filter taught by Wada to be substantially spectrally matched to one of the set of printing colors as taught by Lind, will not produce a viewed color gamut matched with a perceived color gamut of a set of inks when printed on a substrate. This is because additive combinations of the sequentially filtered colors would not imitate the layers of inks when printed on a substrate as subtractive layers of filters would. Additive combinations will produce totally different colors from the layers of inks when printed on a substrate. Therefore, a combination of Wada and Lind will not produce the desired result.

Regarding a combination of Karakawa with Wada, Karakawa teaches monochromatic red, blue and green pulsed laser light source, where the red, blue, and green all produced at the same time. Wada teaches a polychromatic light source filtered sequentially by a rotary filter. The methods of Wada and Karakawa are entirely different methods which teach away one from the other.

Therefore, Karakawa, Lind and Wada cannot be combined, and claim 5 is not rendered obvious in light of Karakawa in view of Lind in further view of Wada.

4. Claims 14 and 17 are patentable under 35 USC §103(a) over Karkawa in view of Lind in further view of Baba

Finally, in the final Office action, the Examiner rejected claims 14 and 17 under 35 U.S.C. §103(a), as being unpatentable over Karakawa in view of Lind in further view of US Patent Application Publication Number 2002/0122019 (Baba).

Claims 14 and 17 depend from claims 10 and 5, respectively. Accordingly, for at least the reasons stated above, the claims are allowable over the art of record.

VIII. Claims Appendix

1. A display for reproducing a proofed image intended for printing on a substrate using a set of inks, the display comprising:

a light source to generate light of a set of at least three colors having at least three different chromaticities, respectively, said chromaticities being selected to define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate; and

a controller to produce a light pattern corresponding to said proofed image by selectively controlling the path of the light of said at least three colors.

2. The display of claim 1 comprising a correction filter, the spectrum of the correction filter being based on the spectrum reflected from a type of said substrate.

3. The display of claim 1 comprising a correction filter, the spectrum of the correction filter being based on the spectrum of an intended light used to view the proofed image when printed on said substrate.

4. The display of claim 1 wherein the light source includes at least a plurality of light emitting diodes.

5. The display of claim 1, wherein the light source includes at least:

a polychromatic source to generate polychromatic light; and

a color filtering mechanism to sequentially generate the light of said at least three colors by filtering said polychromatic light.

6. The display of claim 1, wherein said at least three colors comprise at least four colors.

7. The display of claim 1, wherein the light source produces light of three colors, the transmission spectra of which define said viewed color gamut.

8. The display of claim 1 comprising a spatial light modulator.

9. The display of claim 1 comprising a digital micro-mirror device.

10. A method for reproducing a proofed image intended for printing on a substrate using a set of inks, the method comprising:

producing light of at least three colors having at least three different chromaticities, respectively, said chromaticities being selected to define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate; and

selectively controlling the path of the light of said at least three colors to produce a light pattern corresponding to said proofed image.

11. The method of claim 10 comprising:

accepting image data corresponding to said proofed image; and

converting said image data into converted data corresponding to said at least three colors,

wherein said selectively controlling comprises controlling the path of the light of said at least three colors based on said converted data.

12. The method of claim 10 comprising passing light through a correction filter, the spectrum of the correction filter being based on the spectrum reflected from a type of said substrate.

13. The method of claim 10 comprising passing light through a correction filter, the spectrum of the correction filter being based on the spectrum of an intended light source used to view said proofed image when printed on said substrate.

14. The method of claim 10, wherein producing light of said at least three colors comprises passing light through a color wheel.

15. The method of claim 10, wherein said at least three colors include a red color, a green color and a blue color, the transmission spectra of which define said viewed color gamut.

16. The method of claim 10 comprising spatially modulating the light of said at least three colors.

17. The device of claim 5, wherein said color filtering mechanism is adapted to sequentially place at least three color filters corresponding to said at least three colors, respectively, in the path of said polychromatic light.

18. The device of claim 1, wherein said controller controls the path of the light of said at least three colors based on image data representing the proofed image in terms of said at least three colors.

19. The device of claim 1, wherein said light source generates the light of said at least three colors independently of said proofed image.

20. The method of claim 10, wherein producing the light of said at least three colors comprises selectively producing the light of said at least three colors independently of said proofed image.

21. The device of claim 1, wherein said light source is to generate light of exactly three colors having three different chromaticities, respectively, said chromaticities being selected to define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate.

22. The method of claim 10, wherein producing light of at least three colors comprises producing light of exactly three colors having three different chromaticities, respectively, said chromaticities being selected to define a viewed color gamut which entirely covers a perceived color gamut of said set of inks when printed on said substrate.

IX. Evidence Appendix

No evidence is submitted with this Appeal Brief.

X. Related Proceedings Appendix

There are no related proceedings known to the Appellants related to this application.

Conclusion

In view of the foregoing arguments, and for at least the reasons discussed above, Appellants respectfully submit that the final rejection should be reversed and claims 1-22 should be allowed.

Applicant is a small entity. This is an Appeal Brief for which a fee of $250.00 is due under 37 CFR 41.20(b)(2). Please charge Deposit Account No. 50-3355 for this fee, as well as any additional fees due. A duplicate of this submission is included for this purpose.

Respectfully submitted,

Guy Yonay
Attorney for Appellants
Registration No. 52,388

Dated: July 2, 2007

Pearl Cohen Zedek Latzer, LLP
10 Rockefeller Plaza, Suite 1001
New York, New York 10020
Tel: (212) 632-3480
Fax: (212) 632-3489